

Noxious Times

a quarterly publication of the California Interagency Noxious Weed Coordinating Committee

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The 7th annual CalEPPC symposium entitled, "Taking it to the Field: From Prevention to Management" will convene Friday, October 15th thru Sunday, October 17th at the Sacramento Inn. Friday afternoon presentations will highlight aquatic weeds that threaten California waterways. On Saturday morning, the second session will focus on the introduction, ecological impact, and management of invasive annual grasses. Speakers in the third session will consider the economic impact, methods of prevention, education, detection, ID., and eradication of invasive weeds. The symposium will also feature a poster session and twelve working group sessions. Sunday, participants can embark on one of three field trips. *For more information see www.caleppc.org or contact Sally Davis, sallydavis@aol.com.* A summary of the symposium program is provided below.

Friday, Oct. 15

10am Arrival/Registration

SESSION I

12:30 Welcome

12:40 Keynote Address: Exotic Plants Invade Hot Spots of Native Plant Diversity

1:20 Status of Noxious Weed Bills in California

1:50 Weed Management Areas in California

2:20 Private and Public Funding Opportunities

2:50 *Afternoon Break*

SESSION II - AQUATIC WEEDS IN CALIFORNIA WILDLANDS

3:10 Eurasian Watermilfoil in Lake Tahoe

3:30 Invasive Aquatic Weeds in Freshwater Streams

3:50 Aquatic Weeds in the Delta

4:10 Hydrilla and Other Noxious Aquatic Weeds in California Lakes and Reservoirs

4:30 Poster Session and Social

SESSION III - WORKING GROUP SESSION I

7:30 Artichoke thistle, Brooms and Gorse, Cape ivy, Cortaderia sp., Giant reed, Perennial pepperweed

Saturday, Oct. 16

SESSION IV - INVASIVE ANNUAL GRASSES

8:00 Announcements

8:05 How Landscape Changes Occurred in California

8:25 What Happens When Your Swan Turns into an Ugly Duckling; Impact of Annual Grass Invasion into Perennial Grassland

California Weed Information and Awareness Workshop, October 15, 1999

A statewide informal workshop and brainstorming session on the subject of noxious and invasive weed education and awareness programs will be held in Sacramento. The workshop, held in conjunction with the CalEPPC Symposium, will review existing weed education programs and identify ways to coordinate and share information and avoid duplication of effort. For more information contact Steve Schoenig at (916) 654-0768, sschoenig@cdfa.ca.gov.

7:45 - 8:00	Sign-in
8:00 - 8:05	Welcome: Workshop Goals & Purpose
8:05 - 8:30	General Overviews: Who Currently Does Weed Education in California
8:30 - 9:30	Breakout I: by Type of Target Audience or Educational media
10:00 - 10:20	Break
10:20 - 10:50	Breakout II: by Region of California
10:50 - 11:30	Breakout Reports; Future Direction for Coordination; Participant Forum

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California Agricultural Commissioners and Sealers Association

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Chairwoman's Message: Cheri Rohrer

I'd like to thank Nate Dechoretz for doing a great job during the past two years chairing the CINWCC. Nate outlined the committee accomplishments in his last message: a realistic strategic plan for the committee, along with achievable goals; assisting and encouraging formation of local weed management areas; increasing communication and coordination among agencies and groups concerned with noxious weeds; and fostering the spirit of cooperation and partnership among the environmental community, regulatory community, and land resources agencies. I'm looking forward to a continuation of meeting these laudable goals, as well as identifying and working toward other achievements, while continuing our partnerships and forming new ones.

We have seen the increasing interest in the prevention and management of invasive species. In February, President Clinton signed his Executive Order on Invasive Species. One of the first objectives listed in the Executive Order is to prevent the introduction of invasive species. While not at the top of that list, promotion of public education on invasive species is included as a duty of Federal Agencies whose actions may affect the status of invasive species. The CINWCC is already undertaking actions to meet those objectives. For example, the County Agricultural Commissioners, in cooperation with the Forest Service and the Bureau of Land Management, are developing a program for certification of weed free forage, feed, hay and straw. The use of weed free materials on private and public lands is a measure to prevent introduction of noxious weeds to uninfested areas. In the arena of education, the CINWCC will meet prior to the CalEPPC (California Exotic Pest Plant Council) Symposium in Sacramento, CA. The meeting will focus on the coordination of weed education and awareness programs in California (see announcement on page 1). In addition, the Invasive Species Council created by the Executive Order is required to produce a Management Plan for management of invasive species. This plan is expected to recommend actions at state and local levels to achieve the goals and objectives of managing invasive species. All of these actions highlight the increased emphasis on management of invasive species.

I am looking forward to working with all of you in the furtherance of our goals to prevent the introduction and spread of noxious weeds and to better manage existing infestations. Whether you are attending as a representative of a signatory agency or as a stakeholder, you are an integral part of this committee and your interest, guidance, and energy are invaluable. ❖

Noxious Times is a publication of the California Interagency Noxious Weed Coordinating Committee. The committee was formed in 1995 when 14 federal, state, and county agencies came together under a Memorandum of Understanding to coordinate the management of noxious weeds. The committee's mission is to facilitate, promote, and coordinate the establishment of an Integrated Pest Management partnership between public and private land managers toward the eradication and control of noxious weeds on federal and state lands and on private lands adjacent to public lands.

The *Noxious Times* newsletter intends to help the committee achieve its goals of coordination and exchange of information by providing land managers throughout the state with information on weed control efforts, news, and successes.

Noxious Times is published quarterly by staff of the Integrated Pest Control Branch at the California Department of Food and Agriculture. We welcome submissions for our upcoming issues. Please send to: CA Department of Food and Agriculture, ATTN: Noxious Times, 1220 N Street, Room A-357, Sacramento, CA 95814 or e-mail: noxtimes@cdfa.ca.gov

If you have a colleague whose name you would like to add to our mailing list, please send mailing information to the address above.

Noxious Times Editorial Staff: Carri Benefield, Tom Pimienta, Ivan Sohrakoff, Pat Akers, and Steve Schoenig. Text written by staff unless otherwise noted.

Lassen County Weed Week

BY: Ken Smith, Lassen County Agricultural Commissioner

The Lassen County Board of Supervisors proclaimed the week of June 14-19th as Lassen County Weed Week.

The week was planned and organized by the Lassen County Special Weed Action Team (SWAT), a group of over 25 local agencies, organizations and individuals dedicated to the control and eradication of noxious weeds in Lassen County. The group shares fiscal resources, labor and brainpower to develop an integrated approach of educational, biological, cultural, mechanical and chemical methods.

The week's activities were kicked off with a dedication of a new noxious weed reference section at the Susanville District Library. A variety of informational and educational materials were donated by several SWAT team member agencies.

Other events during the week included:

- A "whistlestop" noxious weed lecture by Butch Kreps, CDFA, at the Railroad Depot
- Open houses at several SWAT team member offices, with informative displays and handouts
- A weed science project display constructed by a fifth grade class at McKinley Elementary School
- Radio promotions for Weed Week



Interested citizens gathered at Lassen College for the first annual Weed Pull Day

The week long observance culminated on Saturday, June 19th at Lassen Community College with the first annual Weed Pull Day and barbecue. More than 50 participants gathered on campus and armed themselves with gloves and plastic bags. The group of eager volunteers bagged over 60 loads of yellow starthistle, Mediterranean sage and dalmatian toadflax. At the afternoon barbecue, Lassen County Supervisor Bob Pyle presented a special recognition award to the local chapter of Pheasants Forever for their efforts at controlling tall whitetop (*Lepidium latifolium*). In addition, McKinley School student Kylee Peck was honored for creating the T-shirt design for Weed Week and local resident Lynn Wright received an award for her efforts in weed control and for her hard work in helping to organize the first annual Lassen County Weed Week. ♦

1999 - 2000 WAR ON WEEDS Mini-Grant Winners

Tulare County Resource Conservation District

Tulare County Noxious Weed
Management and Education
Partnership

\$ 5,000

Humboldt County Weed Management Area

Awareness and Prevention for
Noxious Weeds in Humboldt
County

\$ 2,400

Eastern Kern County Weed Management Area

Informational
Brochure and Symposium
Mojave-Wide
Weed Management Area

\$ 5,000

Central Sierra Partnership Against Weeds

Mapping of Noxious Weeds in
Tuolumne and Calaveras
Counties

\$ 2,600

GPS and Surveying of Weed Populations:

Nowadays most people are probably aware of the existence of the Global Positioning System, better known as GPS. Many know that it's useful for surveying, agriculture, mining, geology, navigating and locating objects on the earth. In fact, GPS has found many important uses in natural resource management, including the mapping of weed populations. This article describes the selection of GPS equipment for the mapping and management of weeds.

A Primer on How it Works

GPS has three major components. The first component is the GPS unit, which gives us access to the system. A GPS unit is a specialized radio receiver combined with electronics for filtering and calculations. The second major component is a set of 24 specialized satellites that the GPS receiver uses for calculating its position. The third component is a set of ground stations for tracking the satellites. Each satellite broadcasts several different sets of information, of which three are most important to our discussion:

1) a time signal, 2) information on the satellites' positions, and 3) a unique binary sequence code (C/A). By receiving the satellite signals, the GPS receiver can triangulate its position by calculating its distance from each satellite. *For an expanded description of different sets of information see www.cdffa.ca.gov/gps.*

Effects of the System on the Field User

The characteristics of the system have at least four major effects on its use in the field: 1) Ninety-five percent of the time, the system (itself) will estimate a position within about 22 meters of the true position. The Department of Defense adds an additional error signal to the system, degrading its accuracy to about 100 meters. This makes the accuracy of an expensive GPS about the same as a low-end model. 2) The receiver has to be able to lock onto at least four satellites in order to determine a position in three

dimensions. 3) Trees, hills or buildings can obscure the satellite signals. 4) At times, the satellites will be clustered in one small part of the sky. Such an arrangement can seriously degrade the accuracy of the position calculations. Some GPS units will stop collecting data under such conditions, and all you can do is wait 20-40 minutes until the satellites move into a better arrangement.

Choosing a GPS Unit: Juggling Needs

The selection of a GPS unit will strongly depend on the needs of the user. Examples of common user needs are: 1) accuracy for navigation, 2) accuracy for detailed mapping (with 2-3 meter accuracy being adequate), 3) accuracy without having to remain on a single location for more than 1 second, 4) the GPS data must be easily transferred to a mapping program (Geographic Information System or GIS), 5) the ability to record specific descriptive information along with the positional data, 6) costs should be kept as low as possible, 7) the unit should be as

Improving the Accuracy of the GPS System: Differential Correction

Most of us would probably wish to locate a weed to better than 100 meters, or even 20 meters. There are several ways of improving the accuracy of the GPS system, but the one that presently offers the best combination of speed, convenience, cost, and dependability is called differential correction, or differential GPS (DGPS). It is not the most accurate, but will provide 0.5 -10 meter accuracy with one second of data, depending on the quality of the GPS receiver. Even the better sportsman models routinely provide 2-5 meter accuracy using differential correction. One to three meters of accuracy has proved adequate for our needs at CDFA, and DGPS has so many other advantages over more accurate approaches that we have never implemented them.

DGPS works on a simple principle. One unit is stationary, at a known location, and acts as a reference base station. The base station unit knows its true location, but continues to calculate its position according to the information it receives from the GPS satellites. The difference between the calculated position and the true position provides an accurate estimate of the errors in the calculated measurement, at the time of the measurement. This estimate of the error can then be applied to the position calculations made at the same time by any GPS unit nearby (called the mobile or rover unit), even if it is moving. For many applications, "nearby" can be anywhere up to 200 miles.

There are two major methods whereby differential corrections can be applied to the measurements made by a mobile unit. 1) Post-Processed DGPS (PPDGPS): The position measurements are stored in the mobile GPS and later downloaded to a computer. The correction measurements from the reference GPS are also downloaded into the computer, and then specialized software applies the corrections to the measurements made by the mobile unit. 2) Real-Time DGPS (RTDGPS): The correction measurements from the reference GPS are sent to the mobile GPS (almost always by radio), and the corrections are applied to the position measurements a split second after they are made. The mobile GPS unit must have the necessary software and circuitry to apply the corrections to the mobile GPS position measurements, but this capability is now common in modern GPS units, even many sportsman models. Such models use phrases such as "DGPS ready" to describe themselves. A separate antenna and receiver must be added to the GPS unit so it can receive the broadcasts from the reference station. In addition, in many cases access to the reference station signals is sold as a separate service. In high-end professional GPS units, integrated receivers for the reference stations are becoming more common.

Equipment and Costs By: Pat Akers

convenient to use as possible. Meeting different requirements affects the cost of the GPS solution.

Low-end Systems - The absolutely lowest cost option is one of the many sportsman GPS models on the market. Many of these units are highly sophisticated, very portable, offer a number of convenient bells and whistles, and cost less than \$300, sometimes as little as \$200. For example, both Garmin and Eagle manufacture 12-parallel-channel GPS units which have received good reviews from users. These systems are limited to 100 meter accuracy unless differentially corrected. Although many of these units describe themselves as "DGPS ready," an antenna and receiver for the correction data must be added separately. They also have limited capabilities to store GPS position information, especially descriptive data.

The next important improvement is the addition of differential correction capability. There are a lot of options, with lots of trade-offs. However, the issue is further complicated because Trimble's "mapping-quality" GPS units all provide essentially a complete mapping package, including the ability to differentially correct data using PPDGPS. Since there is almost a qualitative divide between them and other GPS systems, I will treat Trimble products separately.

Trimble vs. Everybody Else: "Mapping Grade" GPS systems - Trimble mapping products are expensive, but they provide mapping data with 0.5-3 meter accuracy, using a standard computer and Internet connection. Their system includes software (Pathfinder Office) that runs on the PC computer and provides a powerful and easy PPDGPS facility. The package provides reasonably flexible data entry capabilities, the ability to record information on line-type or area-type objects (instead of just points), and flexible integration with GIS systems.

Trimble has essentially two lines that depend on PPDGPS. 1) *Trimble's GeoExplorer* is a hand-held GPS that costs about \$3500 with the battery pack. It provides 1-3 meter accuracy, differentially corrected. It has a fairly flexible data entry capability and it's controlled through a series

of menus, but it has only 8 buttons on the keypad. Text data is entered by scrolling through the entire alphanumeric character set, which can be quite tedious. Fortunately, the data entry screens allow the creation of menus, which can often minimize the need to enter text. 2) *Trimble's Pathfinder Pro XL* has the GPS receiver mounted in a backpack, attached to a handheld datalogger, and its 8- or 12-channel GPS engine provides accuracy to less than a meter. Trimble no longer manufactures it, but it can often be found used. The updated versions of the ProXL are the ProXR and ProXRS, which integrate RTDGPS capability and provide accuracy down to 0.5 meters. They cost \$9,000 to \$12,000. The "ProX" line dataloggers provides better information about the GPS status than the GeoExplorer and they have full alphanumeric keypads. *For further discussion see www.cdfa.ca.gov/gps.*

And for Everybody Else: Real Time Differential GPS (RTDGPS) - RTDGPS has one big advantage over Post-Processed Differential GPS (PPDGPS): the corrected, high-accuracy results are available immediately in the field. This makes RTDGPS extremely useful for navigation, as its accuracy is 1-20 meters, depending on the quality of the receiver and the reference data. The major disadvantage of RTDGPS relative to PPDGPS is that the accurate results depend on remaining in contact with the reference station. Any locations recorded while out of contact will have only 100 meter accuracy, and there will be no way to improve that accuracy, either in the field or the office (unless you also have PPDGPS capability, or want to stay on one location for an extended period of time so you can average the results). PPDGPS does not depend on remaining in contact with a reference station. RTDGPS is also somewhat less accurate than PPDGPS, but the difference is generally negligible for all but the most demanding applications. In the past, RTDGPS had other disadvantages having to do with the complexity and expense of implementing RTDGPS relative to PPDGPS, especially for implementing the most dependable solutions. However, as with most emerging technologies, costs continue

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General GPS Web Sites

www.navcen.uscg.mil/dgps -The Coast Guard site for DGPS

www.fs.fed.us/database/gps/ USFS -GPS Page, especially good for access to Trimble Base Station sites

<ftp://ftp.trimble.com/pub/cbsfiles/> -Trimble's base station files from Sunnyvale, CA

www.fs.fed.us/database/gps/eureka.htm -USFS Eureka, California GPS base station

www.cnde.iastate.edu/staff/swormley/gps/dgps.html -Sam Wormley's DGPS explanations

www.qualityeng.co.uk/gpstutor - GPS Tutor: fairly detailed treatment

vancouver-webpages.com/pub/peter/index.html -Peter Bennett's GPS and NMEA Site

www.geo.swt.edu/reference/Gps.html -GPS LINKS

www.gislinx.com/GPS_Sites/ - Gateway site for links to many GPS and GIS issues

www.utexas.edu/depts/grg/gcraft/notes/gps/gps.html -GPS overview

www.trimble.com/gps/index.htm - Trimble GPS overview

GPS "General Stores"

www.navtechgps.com -Navtech GPS Store

www.cansel.ca -Cansel: sales and rentals GPS and surveying equipment

www.geowarehouse.com - Geowarehouse

www.nvlt.com/index.html -NVLT GPS Receivers and Satellite Communication Products

Mapping and Surveying Grade GPS Manufacturers

www.trimble.com -Trimble GPS Solutions

www.cmtinc.com -Corvallis Microtechnology, Inc

www.satloc.com/index.stm -Satloc: especially for agricultural applications, but also mapping

www.ashtech.com -Ashtech, now merged with Magellan

www.topcon.com -Topcon, mostly surveying

Consumer-grade GPS Manufacturers (including Beacon RTDGPS receivers)

www.eaglegps.com -Eagle Electronics

www.garmin.com -Garmin GPS products

www.magellangps.com -Magellan GPS products

Vendors of FM RTDGPS receivers and services

www.accqpoint.com -ACCQPOINT Communications Corporation

www.dgps.com -DCI's DGPS and TMC Services

Vendors of Satellite RTDGPS receivers and services

www.omnistar.com -OmniStar

www.racal-landstar-usa.com

www.racal-landstar.com -Racal LandStar

Post-Processing DGPS Software

www.geotronics.se:81/gpssoft.shtml - Geotracer System 2000

GPS continued from page 5

to drop and performance improves. In the last year or so RTDGPS solutions have begun to appear that approach the cost-effectiveness and dependability of Trimble units.

The major variable in the cost vs. dependability equation of RTDGPS is the choice of the source for the differential correction data. For most of us, there are three major sources for correction data: 1) commercial broadcasts on FM wavelengths, using transmission facilities of normal commercial radio, 2) commercial broadcasts from geosynchronous satellites, and 3) government broadcasts from specialized Coast Guard DGPS transmitters called "Beacons." As you might expect, there are trade-offs between cost, convenience, and capability for these different options. *For a more complete discussion of sources for data correction see www.cdfa.ca.gov/gps*

Mix and Match - There are two other trends that can affect the choice of a system. First, RTDGPS has such overpowering advantages that manufacturers are integrating RTDGPS receivers with GPS receivers in their higher-end systems. For example, *Trimble's ProXL* has been replaced by the ProXR, which incorporates a Beacon receiver, and the ProXRS, which incorporates both a Beacon and satellite receiver. The other trend is to turn a computer or other equipment into a GPS system. For instance, TeleType produces a small GPS sensor, without any readout whatsoever, that can plug into the PC port of a laptop computer and turn it into a GPS unit. Including software to allow viewing of the results against a background map, it costs about \$850. At CDFA, we are about to evaluate a similar system. It combines a Racal Navigator 2-meter accuracy DGPS sensor (which is a Trimble 8-channel GPS receiver integrated with Racal's DGPS correction receiver), a handheld Windows CE computer, and datalogging/GPS/mapping software to create a complete datalogging RTDGPS system, which should also provide a moving map for navigation purposes. The sensor costs about \$2800, the handheld computer about \$600, the software about \$700, and various costs for cables, battery, and pack bring the total cost to \$4500, which

includes one year of the satellite DGPS subscription service. This competes in cost with the GeoExplorer, yet provides real-time differential GPS in the field for excellent navigation (especially with the moving map), robust satellite service, and a very convenient and flexible data entry system.

What's a Poor Mapper to Do?

If you are trying to get into GPS mapping of weeds, the first step is to establish your priorities, including cost. Your budget will determine whether you can afford differential correction and flexible data entry and manipulation. Also consider where you work. If you work within range of the Coast Guard Beacons, this is definitely an option to consider carefully. A simple sportsman model GPS with an added consumer-level Beacon receiver (accurate to 4-12 meters) would not cost much more than \$600 total. For another \$1100-1500 you could add flexible data entry, by interfacing a Beacon-based RTDGPS sensor with a consumer handheld computer and appropriate software. If you work beyond the range of the Beacons but have a higher budget, *Trimble's GeoExplorer* provides data entry flexibility, good accuracy for mapping via PPDGPS, and no continuing subscription costs. If you can afford an additional \$800 per year above the cost of a GeoExplorer, then a handheld computer system interfaced with a satellite-based RTDGPS will give you accurate navigation, very convenient data entry, and the freedom of satellite RTDGPS. If you cannot afford differential correction, probably greater overall accuracy can be achieved with careful marking of 7.5 min USGS topographic quads in the field, rather than GPS. Finally, remember that GPS is an emerging technology. If you can't afford what you want now, in a year or two it might be available. ❖

Pat Akers is with the Integrated Pest Control Branch, CDFA, pakers@cdfa.ca.gov

For a more expansive discussion see www.cdfa.ca.gov/gps

Spartina alterniflora Project Gets CalFed Funding

By Lars Anderson

Over the past year, several meetings and strategy sessions were attended by representatives from various state and federal agencies, UC-Davis and USDA-ARS researchers as well as local environmental groups, to assess the spread of smooth cordgrass (*Spartina alterniflora*) in sensitive marshes and tidelands. This east-coast species has already displaced the native species, (*S. foliosa*), in Willapa Bay, WA, and has also covered thousands of acres that are normally open mudflats. The populations in San Francisco Bay (presently about 1,000 acres) are mainly in the southern area, but threaten to encroach on nearly 30,000 acres of open mudflats and 40,000 acres of wetlands throughout the bay, as well as several thousand more acres in the upper Delta. Compared to the West Coast native cordgrass, the invading species is generally more robust, has a taller stature, and is able to disperse (via seed and rhizomes) into much lower tidal elevations. To make matters worse, the exotic spartina has begun hybridizing with the native spartina and the hybrids tend to exhibit the more aggressive (and destructive) characteristics of the invader. This stealth-like invasion has the potential of accelerating the spread more quickly than if there were no hybridization.

The recent (1999) round of directed CalFed project support included funding for *Spartina alterniflora* eradication efforts in San Francisco Bay. This project primarily focuses on control using Rodeo herbicide and some mechanical approaches. The Coastal Conservancy, which submitted the proposal to CalFed, facilitates the project and has pledged matching funds. Knowledge gained from the control efforts at Willapa Bay have helped refine methods and practical approaches for the San Francisco infestation. The project also includes some research to improve herbicide efficiency at the USDA-ARS Exotic and Invasive Weeds Laboratory at UC Davis, as well as work on hybridization and biological control at UC Davis under Dr. Donald Strong. Other aspects of monitoring and assessment are being conducted by the San Francisco Bay Estuary Institute.

For additional information contact: Nadine Hitchcock or Maxene Spellman at the Coastal Conservancy, (510) 286-1015, or Debra Smith (Project Coordinator) at East Bay Regional Park District, (510) 635-0135

Further Reading: "Introduced Tidal Marsh Plants in San Francisco Estuary" November, 1998, by Robin Grossinger, Janice Alexander, Andrew N. Choen and Joshua N. Collins, San Francisco Estuary Institute, 1325 South 46th St., Richmond, CA 94804

CalFed Funds Purple Loosestrife Project



The Integrated Pest Control Branch of the California Department of Food and Agriculture (CDFA) was recently awarded \$328,000 by the CALFED Bay-Delta Program to conduct a purple loosestrife prevention, detection, and control program. Purple loosestrife, a showy ornamental, has escaped home gardens and nurseries and moved extensively throughout the wetlands of the United States causing immense ecological destruction. Loosestrife is listed by the CDFA as a "B" rated noxious weed and as a "species with potential to spread explosively" by the California Exotic Pest Plant Council. Based on historic records, the distribution of purple loosestrife is currently in multiple, mostly small and scattered populations, in the Sacramento-San Joaquin Delta system and nearby hydrological units. However, infestations of purple loosestrife often follow a pattern of establishment, maintenance at low numbers, and then dramatic population increase when conditions are optimal.

Purple loosestrife, which spreads primarily by copious production of seeds the size of ground-pepper, threatens to become established and form dense stands that will crowd out native wetland vegetation and associated wildlife, thus threatening the overall biodiversity of aquatic, wetland, and riparian areas. The complex interface between farm land and water in the Bay-Delta estuary also provides rich and varied habitat for wildlife, particularly waterfowl. The displacement of valued flora and fauna and the diminishment of critical

fish and wildlife habitats has been well documented throughout the United States.

Primary program objectives will be to conduct: (1) a broad education and training campaign, (2) extensive surveying and mapping, (3) a collaborative assessment meeting of cooperators to develop site specific adaptive management plans, resulting in (4) comprehensive local eradication and control efforts, and (5) monitoring. The geographical focus will be on the Sacramento-San Joaquin Delta watershed where there are a number of threatened and declining species due to a multitude of environmental stressors. The project will be an extensive collaborative effort with: CDFA Integrated Pest Control Branch District Biologists, County Agricultural Commissioners, local Weed Management Areas, CA Department of Boating and Waterways, the CA Department of Fish and Game, U.S. Fish and Wildlife Service, USDA Resource Conservation Districts, and local watershed groups, amongst others.

For more information please contact Carri Benefield, Purple Loosestrife Project Coordinator; (916) 654-0768, cbenefield@cdfa.ca.gov

Cape Ivy Biological Contr

BY: Joe Balciunas and Greg Archbald

Cape ivy (or German ivy), a native of South Africa, has become one of the most pervasive and alarming non-native plants to invade coastal areas of the west coast of the United States. Botanically, this plant is a member of the sunflower family. Known in the U.S. by the botanical name *Senecio mikanioides*, its accepted botanical name internationally is *Delairea odorata*. Information collected by the California Exotic Pest Plant Council (CalEPPC) notes Cape ivy infestations from San Diego to southern coastal Oregon. Cape ivy is established and highly problematic in most national park units and State Parks along the California Coastline. Though the species prefers moist, shady environments along the coast, there are increasing reports of infestations from inland riparian locations. Cape ivy is spreading in riparian forest, coastal scrubland, grassland, Monterey pine forest, coastal bluff communities and seasonal wetlands. Cape ivy has been ranked in the "most invasive" category (List A-1) by CalEPPC in its listing of "Exotic Pest Plants of Greatest Ecological Concern in California."

This invasive species shows every indication of rapid adaptation and spread, leaving the fate of extensive inland areas like the Delta in question. There is recent preliminary evidence that Cape ivy may have damaging effects on aquatic biota of coastal streams, including possible poisoning of aquatic vertebrates and invertebrates by toxic compounds contained in the plants and physical interruption of food sources for aquatic species. This could have major implications for the biological future of anadromous fish, including endangered runs of salmonids, and other wildlife depending on coastal streams and riparian zones.

Unfortunately, Cape ivy on the U.S. west coast prefers and grows vigorously in physically challenging environments such as streamside thickets, willows, and poison oak. Such growth habits make Cape ivy extremely difficult to control by conventional mechanical and chemical means. Given this sobering picture and the high biological stakes, we need every possible weapon to combat this species. Development of a safe and effective classical biological control program for Cape ivy has become an urgent priority. If successful for Cape ivy, biocontrol will give land managers an extremely cost-effective tool and it will bring the added benefit of minimizing the use of herbicides in the environment. Biocontrol offers the best chance, within a framework of integrated pest management, to protect coastal habitats from extensive degradation due to Cape ivy.

A Promising Biocontrol Study is Launched

In 1996, Dr. Balciunas of the USDA-ARS, Albany, CA went to South Africa to attend an international biocontrol conference and while there toured extensively to see Cape ivy in its native habitat. Cape ivy was found to be an uncommon species, well controlled in its native range, presumably by one or more organisms present in South Africa. Cape ivy appeared to be a promising candidate for a classical biocontrol program. Fundraising began in the summer of 1997. Two complete years of funding

were received thanks to the wonderful support from the California Native Plant Society (CNPS) statewide organization, four local chapters of CNPS, the California Exotic Pest Plant Council, the National Park Service, California Department of Parks & Recreation, the David & Lucile Packard Foundation, and a major private donor.

Scientists at the Plant Protection Research Institute in Pretoria (one of the world's premier groups for research into biological control of weeds) were enlisted to carry out the study. In the



first year, extensive field surveys were conducted. Accomplishments to date include: (1) Two dozen insect species that attack Cape ivy have been collected and most have been identified, (2) Specific information on the organisms and their impact on plant development and recruitment has been collected by way of field notes, photographs, and a PPRI database. The same suite of insects was found attacking Cape ivy throughout its range in South Africa, (3) Four candidate species, suitable for classical biocontrol testing, have been identified (see table). These appear to be insects specialized to utilize Cape ivy, (4) Climatic requirements of the four candidate

ol Effort Enters Year Two

species appear to be broad, (5) Additional field research needs have been identified, and (6) The geographic distribution of Cape ivy across South Africa, its habitat requirements, and its phenology (information that will be vital to the Year Two studies) have been documented.

Year Two - Building On a Successful Beginning

The work plan for the second year is an accelerated plan based on the rapid pace of field work and the richness of detailed information achieved in the first year. Scientists in South Africa will not only study the host range specificity of candidate biocontrol agents in the field, but will also begin laboratory investigations into the biology of the most promising candidate insects — aimed at defining further their practical potential as biocontrol agents.

The following questions will be addressed in Year Two: (1) Will detailed field surveys in Year Two disclose any remaining insects or pathogens suitable as candidates for classical biocontrol? (2) Which of the insects has a life history and biology which would support it being considered as a candidate for further studies in South Africa? (3) Are the candidate species specialized and specific enough to Cape ivy (i.e. not damaging plants closely related to Cape

ivy) to warrant exporting them to the U.S. for rigorous testing in quarantine? (4) Do exclusion tests show that Cape ivy exposed to attack by the candidate species is negatively impacted compared with Cape ivy growing in the absence of these natural enemies?

It is also important to note that additional work will be done in the U.S.—thanks to the ongoing support for the Cape ivy biocontrol effort provided by several cooperating agencies, individual students, and volunteers. This additional work includes but will not be limited to the following:

- Coordination of the ancillary studies listed below (USDA Albany)
- Toxic alkaloid analysis (USDA Albany)
- Seed viability research (USDA Reno)
- Fish toxicity experiment (NPS-GGNRA & USGS-BRD)
- Current insect utilization of Cape ivy in California (Cal Poly San Luis Obispo)
- Selected graduate degree studies (UC Davis)
- Seed collection for future quarantine testing (CNPS)

While an exact dollar amount cannot be assigned to this work, a conservative estimate of the value would be at least

\$150,000 U.S. This work is testimony to the widespread sense of urgency regarding Cape ivy, and the momentum that has been generated to devise effective means for controlling this species. ❖

To become a project partner/donor, or for any general inquiry regarding the Cape ivy biocontrol project please contact: Jake Sigg, California Native Plant Society, (415) 731-3028, jsigg@pacbell.net

For details regarding the USDA-ARS, its role in the project, or details of the survey, please contact: Dr. Joe Balciunas, USDA-ARS, Western Regional Research Center, (510) 559-5975 joebalci@pw.usda.gov



While in South Africa, Dr. Joe Balciunas, USDA-ARS, toured extensively to see cape ivy in its native habitat.

Most Promising Potential South African Insects for Biocontrol of Cape Ivy As of May 1999			
Type of Agent	Identification	Mode of Action	Damage to Cape ivy
stem-boring moth	Lepidoptera: Plutellidae <i>Acrolophia</i> sp.	larvae bore into stems	damage appears to cause death to upright stems
gall fly	Diptera: Tephritidae <i>Paratreutrela regalis</i> Munro	larvae cause large galls	galls prevent further elongation and growth of stem
defoliating moth	Lepidoptera: Arctiidae <i>Diota rostrata</i>	larvae consume leaves	sometimes very numerous and damaging
defoliating beetle	Coleoptera: Chrysomelidae Galerucinae	adults feed on foliage	notable damage to young foliage at some sites

Profile Caltrans Invasi

The California Department of Transportation, or Caltrans, is responsible for the design, construction, and maintenance of the state's vast highway system. This system provides the very important service of transporting people and goods, while supplying the state with 20,000 jobs. Twelve districts (see map) located throughout California are responsible for planning, designing, constructing, and maintaining the state's highways, while the headquarters (in Sacramento) oversees the department's statewide operations.

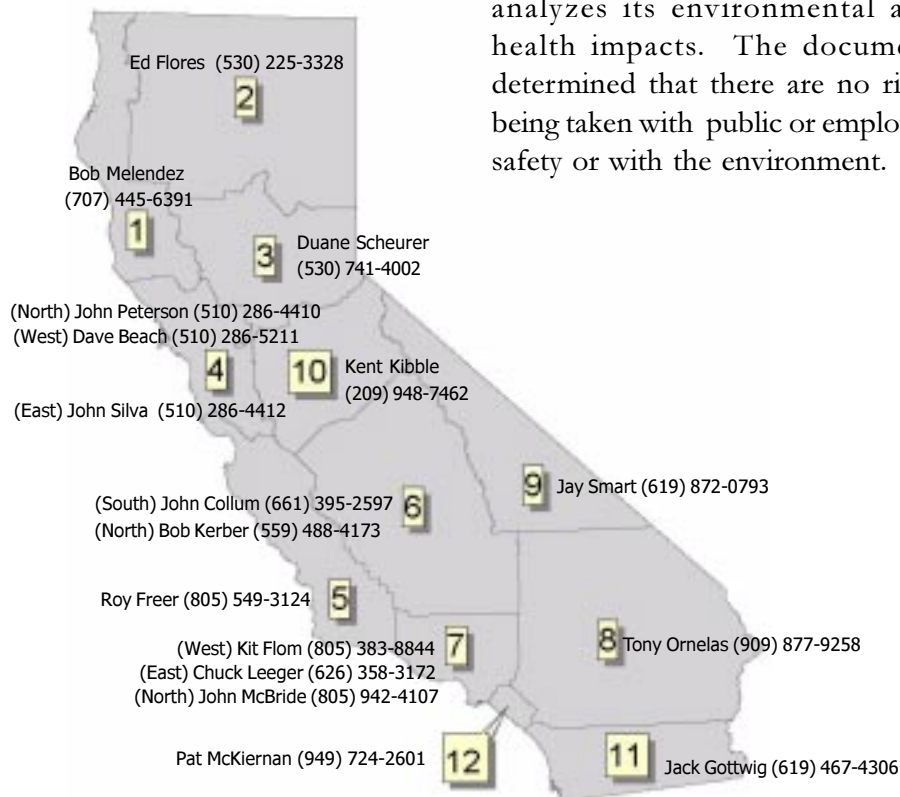
After the completion of a construction project, the maintenance of the highway is turned over to the Maintenance Program,

which maintains more than 230,000 right-of-way acres and 15,000 miles of highways. Around 11% of the roadside land acreage (or right-of-way) is planted by Caltrans through contracts as upgraded landscape areas. Landscaped areas are typically planted in metropolitan and urban areas where an improved appearance is desired to complement adjoining development. Annual maintenance costs are nearly \$800,000,000, about 40% of which is spent on roadsides.

In the late 1980's, public concern for the environment prompted Caltrans to produce an Environmental Impact Report (EIR) on its vegetation control program. The final EIR was published in 1992. It describes the program and analyzes its environmental and health impacts. The document determined that there are no risks being taken with public or employee safety or with the environment.

Adopt-A-Highway and Weed Control

Caltrans has partnered with the Central Sierra Partnership Against Weeds Group to provide a rare Adopt-A-Highway effort focused on weed control. Adopt-A-Highway is usually focused on litter removal, graffiti abatement, or roadside plantings. The *Central Sierra Partnership Against Weeds Group* has adopted a five acre strip along Highway 108 in Tuolumne County for the purposes of weed control. Targets for chemical control include yellow starthistle and oblong spurge. The group has plans to control Italian thistle, Klamath weed, cockle bur, tar weed, Scotch broom, tree of heaven, and puncture vine, all of which co-infest the site. Caltrans provides Adopt-A-Highway volunteers with appropriate permits, hats, gloves, and safety training at no cost. Adopters are recognized for their contribution by the placement of a roadside sign.



Weed Control

Each of the 12 Caltrans districts (see map) employ a Landscape Specialist who focuses on coordinating vegetation control efforts within their district. Each Landscape Specialist is a licensed Pest Control Advisor and has vegetation management expertise.

An important topic within the Caltrans vegetation control program is the minimization of noxious weeds.

ve Weed Control Efforts



Scotch
broom



tamarisk



yellow
starthistle

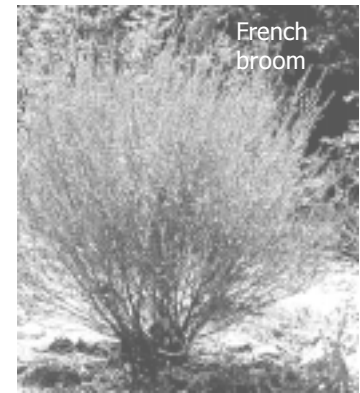
Six distinct eco-provinces have been identified in the state and each requires a different weed control strategy. Caltrans uses the Integrated Vegetation Control (IVM) approach, which employs the correct tool for each situation while continually searching for more effective tools.

Every area of the state has its own list of unwanted plants. Some of the most common unwanted plants that the department is challenged with are: yellow starthistle, Russian thistle, French and Scotch broom, pampas grass, tamarisk, arundo, and gorse (see photographs). The most wide-spread and most troublesome noxious weed for Caltrans is yellow starthistle. Caltrans is working with many weed eradication

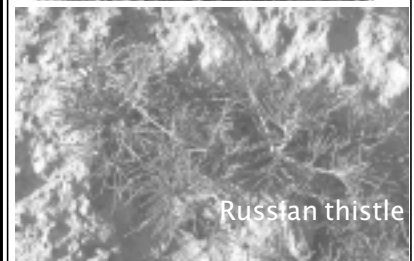
groups around the state to control or reduce the spread of unwanted plants.

Control Methods

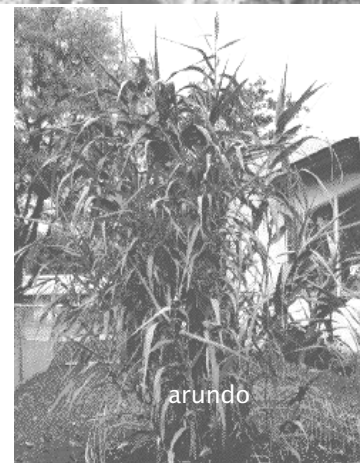
Roadside vegetation growth is controlled by Caltrans with the use of herbicides, cutting machines, corn gluten, steam, mulches, and fabrics. Due to health and environmental concerns, the department established ambitious herbicide reduction goals for controlling vegetation. A short-term goal of a 50% reduction by the year 2000, and a long-term goal of an 80% reduction by 2012 were established (see graph). Currently, the only promising alternatives to herbicide weed control are fabric and mulches. The fabric is used under guardrails and around signs, and the mulches are used around shrubs and trees. Assuming an average rainy season this winter (rainfall determines the amount of herbicide use), Caltrans will meet the 50% reduction goal for the year 2000.



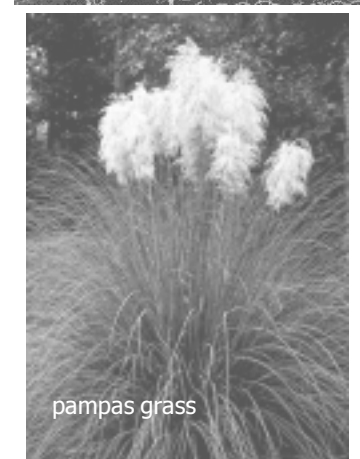
French
broom



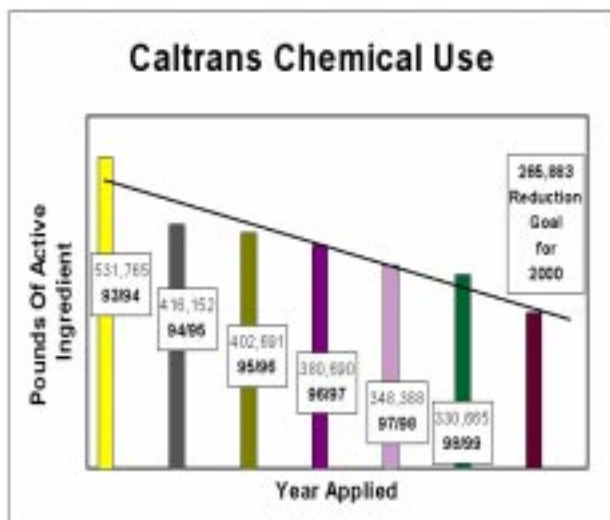
Russian thistle



arundo



pampas grass



New Technology

One way of reducing herbicide usage involves new technology such as the chlorophyll-detecting spray device. This device aims precise streams of herbicide at a desired green target (ideally an undesired noxious plant), thereby reducing the amount of wasted herbicide. Caltrans has purchased such a device and is still in the trial period. However, tests indicate a 40 to 60% savings in postemergent application with this device.

Other technological assistance includes the use of Geographical Information Systems (GIS), and Global Positioning Systems (GPS). Using Global Positioning Systems, spray patterns can be planned and loaded into a computer. This information can control the spray device so the exact desired pattern is produced. This technology gives exact control of the location and rates of pesticide application, which can greatly reduce herbicide consumption.

Alternative roadside vegetation species (native or non-intrusive plants) can decrease or eliminate the need for vegetation control. Caltrans is cooperating with a number of agencies to identify and evaluate these species. ♦



YST Mapping Continues

Caltrans and the California Department of Food and Agriculture (CDFA) have teamed together to complete a multi-agency mapping of yellow starthistle (YST) at mid-elevations in the central and south-western Sierra and within highway right-of-ways in the central-western Sierra. The primary goal of these activities is to determine regional priorities for YST control. Although the 12 million acres of YST is beyond statewide eradication, there are large areas that can still be protected from its presence. Mapping is taking place at a high level of resolution and is put into a Geographic Information System to assist the multi-agency effort. See *Noxious Times*, Vol. 2, No. 1, or www.cdffa.ca.gov/map_yst for further information.

Re-establishing Natives

An experimental native grass project on Interstate 5 near Willows was implemented Fall of 1995 to determine if Caltrans could control noxious weeds by changing existing annual exotic grasslands to a perennial, native grass savannah in the freeway median. The 34.4 acre project site is contained within the 45-foot wide median on Interstate 5 in Glenn County.

There are many benefits of native perennial grass establishment. One such benefit is the reduction of exotic weed species such as yellow starthistle. Existing exotic invasive weeds often require multiple pesticide applications and mowing. In addition, an established native perennial grass savannah requires very little maintenance. While native grasses can take up to four years to establish deep roots, they provide competition against nearby exotic, noxious weeds.

Methods of soil preparation included removal of existing weeds, disking to a six-inch depth, leveling the ground, and breaking up dirt clods. Native grasses were hand-spread and lightly harrowed. Herbicide applications included Roundup to kill invasive weeds and Garlon 4 to control broadleaf plants, while Transline was tested for the reduction of yellow starthistle. Mowing and reseeding were done on an as-needed basis.

Initial results show the absence of tall, invasive weeds and the presence of native grasses. The native grasses prove to withstand flooding and excessive weight and traffic disturbances due to construction activity. The successful establishment of perennial native grasses at this site provides Caltrans with valuable information on alternative weed control methods.

This article was written by Ivan Sohrakoff, a new member of the Noxious Times editorial staff. Larry Shields, Caltrans supervisor, contributed to this article. For further information, please contact Larry Shields at (916) 654-4329

Update: Assembly Bill 1168- Noxious Weeds Management Program

Assembly Bill 1168 Frusetta - "Noxious Weeds Management Program" has gone through 7 rounds of amendments and refinements, has passed unanimously in both houses, and now sits on Governor Gray Davis' desk awaiting signature or veto. The bill would allocate \$500,000.00 per year, for three years, to a combination of weed control research and direct aid to County Weed Management Areas. The program would be administered by the California Department of Food and Agriculture. The Governor will decide to sign or veto by the deadline of October 10, 1999. Those who would like to either support or oppose the bill may contact Gray Davis at (916)-445-2841 voice, or (916)-445-4633 fax.

Integrated Weed Management for Control of Yellow Starthistle at Fort Hunter Liggett

BY: Larry Bezark

The California Department of Food and Agriculture Biological Control Program, in conjunction with the University of California at Davis, the Fort Hunter Liggett Integrated Training Area Management group, the Fort Hunter Liggett Land Rehabilitation and Maintenance group and the Monterey County Department of Agriculture is embarking on a five-year program to reduce populations of yellow starthistle on Fort Hunter Liggett property in Monterey County. The Army Environmental Center is assisting with program coordination.

Yellow starthistle is a major weed on Fort Hunter Liggett land where its presence restricts military training activities, increases fire danger, displaces native vegetation and threatens endangered species located on the installation. Surveys show that the heaviest density of yellow starthistle occurs in five different habitats, each requiring control methods that are specific to that habitat. The habitats are:

- Open grasslands, open space and industrial sites surrounding urban areas or areas used for military training or recreation

- Open grasslands, wildlands or grasslands surrounded by oaks
- Stream corridors
- Open grasslands, grasslands with rare plants or species of concern (purple amole and Santa Lucia mint)
- Vernal pools

A management plan has been developed for each habitat and implementation of control measures for each habitat will be demonstrated. Once completed, yellow starthistle control measures could be implemented on the entire installation or other similar infested lands. The plan supplements on-going control activities currently being implemented adjacent to installation lands by state and county governmental agencies. Control measures will include burning, mowing, chemical applications and implementation of biological control agents. Revegetation activities in the open grassland areas will occur after yellow starthistle populations become diminished.

Understanding the endemic ecosystem of a habitat is critical in the development of its management strategy. Important considerations include what species are present now and which

species are likely to replace starthistle following its reduction. The plant collection located on the installation will play an important role in identifying the plant species and communities present. It is also important to determine if another, equally undesirable, species will replace yellow starthistle with the application of a specific control option. Management strategies will include preventive measures to limit reinvasion by noxious weed species.

Biological control of yellow starthistle is currently being pursued in a cooperative effort by the United States Department of Agriculture and the California Department of Food and Agriculture, with the assistance of the California County Agricultural Commissioners. To date, five exotic insects from Greece have been established in the western United States, and several of these occur at Fort Hunter Liggett. This spring and summer, populations of two weevil species were established. Populations of the biological control agents will be monitored and redistributed within the infested area.

Larry Bezark is a Senior Environmental Research Scientist with the California Department of Food and Agriculture. For further information contact Larry at lbezark@cdfa.ca.gov

Minutes of the California Interagency Noxious Weed Coordinating Committee Meeting

Sacramento, CA July 22, 1999

Agency Reports

California Agricultural Commissioner's Association (CACASA): (1) *Weed Free Forage Program*- Work towards draft certification procedures continues; Rice straw new addition to certification program; USFS and BLM closure program- work continues to get program in place- components include: education, citation, and cost recovery. (2) *Invasive Horticultural Species*- California Association of Nurserymen (CAN) and retailers continue to meet and move forward; A list of invasive horticultural plant species is available from Ed Meyer, Contra Costa County (925) 646-5250; Aquatics meeting scheduled for end of July, main topic to include invasive aquatic nursery stock sales, especially *Salvinia molesta*.

California Department of Food and Agriculture (CDFA): (1) *Yellow starthistle mapping project*- CDFA and CalTrans collaborative effort, focus area boundaries include: State Hwy 80 (north), State Hwy 41 (south), State Hwy 99 (west), and as far east as the highest elevation on each State Hwy in the area. Objectives include: (a) finding leading edge into certain elevations, (b) providing inventory/mapping data to Park Service and Forest Service to help plan and distribute monies for control and eradication efforts, (c) CalTrans interest lies in mapping roadside and beyond fence-line. A set of maps will be sent out to CINWCC stakeholders for collecting data. Protocol and directions will be included. (2) *California State Assembly Bills*- AB1168, \$1.5 million put back in for Weed Management Areas (WMAs), bill now proceeds to Conference Committee, CINWCC Stakeholders are encouraged to talk to Urban area representatives.

California Exotic Pest Plant Council (CalEPPC): Annual symposium to be held October 15-17th in Sacramento (see announcement and schedule, pages 1 and 15).

CalFed Bay-Delta Program: *Nonnative Invasives Task Force Update*- \$1 million in directed action awarded to aquatic and semi-aquatic invasives, including: *Spartina* and purple loosestrife (see article on page 7), as well as, projects related to bait sales, restaurant sales, mitten crab, non-native clams, and Zebra Mussels.

Range Management Advisory Committee (RMAC): *Strategic Plan*- Plan approved by Board of Forestry, only minor changes were requested.

USDA-Agricultural Research Service: (1)

Tamarisk Biocontrol Update- see article on page 13 (2) *Arundo Biocontrol*, European exploration and collaboration continue (3) Joe Balciunas (USDA-ARS) and Dale Woods (CDFA) completed an overseas yellow starthistle (YST) biocontrol exploration trip to Turkey, Greece, and S. Russia. Cooperators were re-identified and established. Turkey looked most promising for potential YST biocontrol agents.

Hunter-Liggett Plan: See article on page 13
Bureau of Land Management (BLM): Working on educational materials for Weed Free Forage Program.

US Forest Service: (1) Mendocino WMA forming (2) David Baake NEW Region V. Pesticide Use Coordinator (3) Inyo/Mono forests involved with tamarisk biocontrol effort (4) Sierra Nevada Framework still in the works, due out late August- when available will send Weed part out the CINWCC stakeholders and representatives.

Natural Resource Conservation Service (NRCS): Completed development of vegetation guides for all Major Resource Areas- species appropriate for rangeland and other NRCS lands are specified- most invasives were removed, while many natives were added to the guide. The guide is expected on the Web by spring 2000.

Boating and Waterways: (1) CDFA and Boating and Waterways reached an agreement to continue hydrilla control for 3 more years (2) Work towards EIR for *Egeria densa* continues (3) Water hyacinth really knocked back by control work in the Delta this year.

University of California: Aquatic Weed School scheduled for October 5-6th at the Heidrick Ag History Center in Woodland, CA

National Park Service: (1) Detailed yellow starthistle mapping in Sequoia and Kings Canyons is underway (2) Currently reviewing NEPA guidelines- trying to clarify section on exotic species (3) Spotted knapweed being controlled in Yosemite with Transline

California Department of Forestry: Jackson State Experimental Forest (Mendocino)- Received \$30K to start biocontrol program for French broom. First year seed monies will be used to fund an Australian scientist who will

screen for root, seed, and shoot feeders in Europe. The Mendocino WMA is involved.
CA Fish and Game: Have started writing brief Invasive Species Management Plans using an Integrated Pest Management approach.
Caltrans: Cooperating with CDFA on yellow starthistle leading edge mapping project.

General Business

General Discussion- (1) Cheri Rhorer was nominated as next CINWCC Chair (2) To encourage participation at CINWCC meetings it was proposed that the group meet twice yearly- in February and October (rather than 4 times/year). Additional meetings would be called on an as-needed basis. (3) The desire for a closer connection between WMAs and CINWCC was expressed.

War on Weeds (WOW) Mini-Grant Program- proposals were reviewed and ranked. See page 3 for list of successful proposals. A discussion on whether the War on Weeds mini-grants program should continue was initiated- Should CINWCC stakeholders contribute monies, increasing available pot of money? Should monies be redirected to Weed Free Forage Program? NRCS mentioned potentially matching WOW funding, \$5-10K for field trials?

Research Needs Survey- Survey was distributed to CINWCC representatives in early July; 50% have been returned. Once all surveys have been returned, results will be tallied, organized, and distributed. A special meeting to further develop and prioritize the list will be organized for a future date; participants will include CINWCC and other interested parties. It is hoped that the list will be used for future legislation directives, used by UC research scientists, and further in Invasive species groups' research, education, and management planning/direction.

Weed Education and Awareness Workshop- A morning session is slated for October 15th, see page 1. ❖

Change-in-Address or Add a Friend

If you have a change to make to your address as it appears on the label, or if you would like to add a colleague to our mailing list, please fill out and send in this form.

Name: _____

Organization: _____

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City, State, Zip: _____

Please mail to: CDFA attn: Noxious Times, 1220 N St., Room A-357, Sacramento, CA 95814

CalEPPC schedule continued from page 1

- 8:45 Use of Prescribed Fire for Invasive Grass Management
- 9:05 Management of Alien Grasses in the Mojave and Sonoran Desert
- 9:25 *Morning Break*
- SESSION V - PREVENTION AND ERADICATION PROGRAMS**
- 9:45 Developing an Integrated Approach
- 9:55 Economics of Invasive Species Prevention
- 10:20 Protecting Uninfested Lands: Reducing Weed Spread Following Fire
- 10:45 Noxious Weed Education Program
- 11:15 Identification of Invasive Weed Species
- 11:45 CDFA Noxious Weed Eradication Program
- 12:00 *Banquet Luncheon*
- SESSION VI - UPDATES AND BUSINESS MEETINGS**
- 1:00 Election Results, CalEPPC Web Page, *Noxious Wildland Weeds of California*, *Cortaderia* Research Grants, Biocontrol Projects, Red Alert

**SESSION VII - WORKING GROUP
SESSION II**

- 1:45 Yellow starthistle, Saltcedar, Cordgrass, Fennel, Veldtgrass, Volunteers
- 3:15 *Afternoon Break*
- SESSION VIII - INVASIVE WEED MANAGEMENT**
- 3:30 Weeding the Wilderness; Non-native Plant Management at Point Reyes National Seashore
- 3:45 Prescribed Burning and Competitive Reseeding as Tools for Reducing Yellow Starthistle at Pinnacles National Monument
- 4:00 Mechanisms Responsible for Enhancing the Effectiveness of Glyphosate in Controlling Perennial Pepperweed
- 4:15 The Ecology and Invasive Alien Plants; Mechanisms of Invasiveness of the Exotic Weed Scotch Broom
- 4:30 Restoration of French Broom-Invaded Habitat; Effects of Prescribed Burning, Seed Bank Composition and Time Since Invasion

- 4:45 Giant Cane (*Arundo donax*) Control and Herbicide/Surfactant Impacts to Larval Frogs and Fish
- SESSION IX - BIOLOGY AND ECOLOGY**
- 3:30 The Role of Molecular Systematics and Phylogeography in Biological Control
- 3:45 There's More to Tumbleweeds (Russian thistle) Than Meets the Eye
- 4:00 Smooth and California Cordgrass and Their Hybrids in San Francisco Bay
- 4:15 Spreading Mechanisms of Dense-flowered Cordgrass (*Spartina densiflora*) in California Tidal Marshes
- 4:30 Rates of Transpiration by a Native Willow, *Salix exigua*, and by a Non-native Invasive, *Arundo donax*, in a Riparian Corridor of Northern California
- 4:45 Burrowing Mammals and the Naturalization of *Lactuca serriola*, an Alien Ruderal Plant

Sunday, Oct. 178:30 *Full and Half Day Field Trips*

New Invasive Aquatic Found in Wildlands of CA

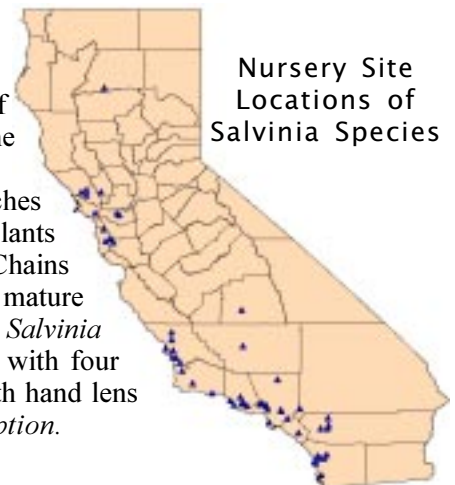
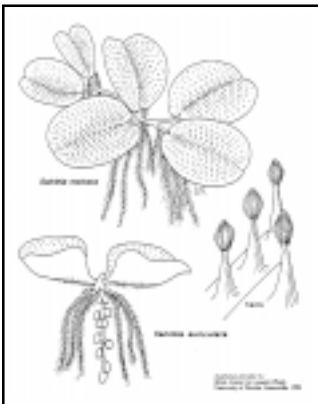
Giant salvinia, an invasive aquatic weed, was recently found for the first time in California's wildlands. Live specimens were found in the Colorado River in Southern California on August 4th. Giant salvinia has been found offered for sale as a water garden plant in nurseries (see map).

"Giant salvinia" is a common name that refers to several species of floating, aquatic ferns: *Salvinia auriculata*, *S. bilboa*, *S. herzogii*, and *S. molesta*. Native to South America, its introduction by humans has caused severe economic and ecological problems in many countries including New Zealand, Australia, and South Africa. Giant salvinia is both a Q-rated species by the California Department of Food and Agriculture and a federally listed noxious weed.

Salvinia is an aggressive invader of freshwater lakes, ponds, slow moving streams, rice fields, ditches, swamps and marshlands, with the potential to rapidly cover the water's surface, spreading by vegetative fragments that are able to develop into more floating plants. It forms floating mats that shade and crowd out important native plants. Thick mats reduce oxygen content and degrade water quality for fish and other aquatic organisms. Mats impede boating, fishing, and swimming and clog water intakes for irrigation and electrical generation.

Since salvinia was found, two meetings of stakeholders and interested parties have been held in Blythe, CA. A Task Force was formed with the US Fish and Wildlife Service serving as the Federal lead agency and the California Department of Food and Agriculture taking the State lead. The current infestation extends from the main drain of the Palo Verde Irrigation District to the Imperial Irrigation System.

In general, salvinia species are characterized by oblong, floating leaves, ½ to 1½ inches long. Young plants have smaller leaves that lie flat on the water's surface. As plants mature and aggregate into mats, leaves are folded and compressed into upright chains. Chains of spore bearing structures ("sporocarps") can often be found on the underside of mature plants. An important characteristic, found only in this complex of federal noxious *Salvinia* species, is on their leaf surfaces, where cylindrical hairs in rows are each topped with four branches joined at the tips to form a "cage- or egg beater-like" structure, visible with hand lens (see sketch). See <http://nas.er.usgs.gov/ferns.htm> for photos and further description.



Giant salvinia may be introduced with aquarium or water garden plants!

If you have seen this plant in cultivation or in the wild, or would like further information, please contact Nate Dechoretz who is with the Integrated Pest Control Branch, CDFA, (916) 654-0768.

There are a total of 56 documented nurseries selling *Salvinia* species. The map shows all cities with *Salvinia* reports. Sites were surveyed between 5/99-9/99.

3 Ways to add a colleague or neighbor to our mailing list...

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bottom of page 14
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Sacramento, CA
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(916) 654-0768

Upcoming Events:

July 16 - 20, 2000. ANNOUNCING: First call for papers and advanced registration. The Aquatic Plant Management Society's 40th Annual Meeting and Symposium on Invasive Aquatic Weeds to be held July 16 - 20, 2000, at the Handlery Inn in San Diego. There will be a special post-meeting five day field trip (July 21 - 25) of Aquatic Invasive Weed Management Programs in California from San Diego to Lake Tahoe and through the Sacramento-San Joaquin Delta. Target weed projects will include hydrilla, salt cedar, arundo, egeria, Eurasian watermilfoil, water hyacinth and spartina. Preregistration is \$125 thru January 15, 2000; registration will be \$150 from January 15 thru May 15, and \$175 at the meeting. Reservations for the five day field trip are approximately \$789 and must be paid by April 15, 2000. *For more information contact Dr. Lars Anderson, USDA-ARS Exotic and Invasive Weed Research, One Shields Ave., Davis, CA 95616 lwanderson@ucdavis.edu.*

The Jepson Herbarium Public Programs is offering a series of workshops on botanical and ecological subjects for the 1999-2000 season. Many weekend workshops are offered, as well as longer, specialized classes. Examples of weekend classes include:

California Soils from a Botanical Perspective	Oct. 2-3, 1999
Deep Green -Diversity and Phylogeny of Plants	Oct. 23-24, 1999
<i>The Jepson Manual: How to Use the Keys</i>	April 1-2, 2000
Poaceae	April 29-30, 2000
Compositae (Asteraceae, Daisy Family): Especially Tarweeds	May 20-21, 2000
Challenges in Rare Plant Conservation	May 19-21, 2000
<i>Astragalus</i> II, "Revenge of the Locoweeds"	June 9-11, 2000
Restoration Ecology	Aug. 11-13, 2000

Basic Botany, Botanical Illustration, and Special Series classes are offered in addition to weekend courses. The Jepson Herbarium's programs, supported by *The Friends of the Jepson Herbarium*, are designed to provide members of the systematic, ecological, and conservation communities access to specialists in their field of study. The classes are designed to accommodate botanical enthusiasts ranging from beginners to specialists. *For more information, contact: Staci Markos at (510) 643-7008*



**California Interagency
Noxious Weed
Coordinating Committee
*Noxious Times***

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Sacramento, CA 95814

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requested